HARDWARE OR SOFTWARE?
WADING
THE VIDEO STREAM

Quality or value? Streaming server software provides both. The images might not be as crisp as those of hardware encoders, but their price—typically free—makes them hard to resist. Still, if you need the ultimate in quality, consider a hardware encoder.

Buckaroo Banzai sweeps in to save Penny Priddy and retrieve his oscillation overthruster from the evil Lord John Whorfin just in time to save the Earth from ...

Wait a second! Your users aren't watching full-screen movies at their desktops. They're doing serious work. Corporate training. Videoconferencing. Distance learning. But they'll do it better if they can see clear, full-motion images on their computers. Bringing video to the desktop is an important cost-saving step for the enterprise. Your job is to find the best technology to deliver it to your staff and partners.

Enterprise customers have two primary

BY DARRIN WOODS | **PHOTO BY WENDY IDELE**

choices: hardware-based MPEG encoders or software-based encoders combined with streaming servers. From an ROI (return on investment) perspective, most enterprises will find it easiest to recoup their investment on the streaming servers, since those servers are often free. Furthermore, streaming servers can conserve bandwidth, since it's often possible to send decent quality images even over a dial-up connection—a trick hardware encoders can't perform.

On the other hand, hardware encoders provide the ultimate in quality. While the MPEG encoders have a higher entry cost and greater cost per seat than do the streaming servers, they have the advantage of being one-box solutions that need no additional hardware outside of the video source and a network connection. To deliver video to every desktop within an organization, MPEG is probably not the solution. But conversely, streaming servers may not be the best solution for providing a high-quality video signal to boardrooms or sales meetings.

On the hardware encoding front, we asked several vendors to participate in our tests and found only two that had the guts to show their stuff: Amnis Systems and VBrick Systems. We invited Optibase and Cisco Sys-

tems, but neither was willing to put its money where its mouth is. Minerva Networks and Path 1 Network Technologies didn't have finished products ready to show. Amnis and VBrick have similar products and delivered essentially the same quality throughout our testing.

We wanted to test cross-platform compatibility to see which vendor could deliver to something beyond a Microsoft Windows-centric network but found that our two participants were just that: Windows-centric. Worse yet, we found that, because of driver and DLL problems, they would not operate on the same machine. An enterprise would therefore need to choose one or the other to use for its corporate video solution. Even with the incompatibilities, it was a tough decision to choose one over the other. In the end, we chose Amnis' offering as our winner, because of its one-box solution and multiple resolution and bandwidth capabilities.

On the streaming server side, we found the compatibility dreams that are made of. Unlike hardware encoders, the main issue with these servers is, indeed, compatibility. Our three participants—Apple Computer, Microsoft and RealNetworks—proved that their players could work on multiple operating systems and deliver some level of quality video to each. We graded each on quality, compatibility, ease of use and price.

After we spent weeks in arduous testing and watching our favorite

REPORT CARD • Streaming Video Software

	Weight	Apple Computer Darwin Streaming Server 4	RealNetworks RealSystem iQ	Microsoft Windows Media Services
VIDEO QUALITY	40%	4.1	3.7	2.5
CLIENT OS COMPATIBILITY	15%	3	5	3
COST	15%	5	2	4
EASE OF SETUP/USE	15%	4	5	3
SERVER OS COMPATIBILITY	15%	5	5	1
TOTAL SCORE		4.19	4.03	2.65
		B+	B+	C−

A≥4.3, B≥3.5, C≥2.5, D≥1.5, F<1.5 A-C GRADES INCLUDE + OR − IN THEIR RANGES. TOTAL SCORES AND WEIGHTED SCORES ARE BASED ON A SCALE OF 0-5. CUSTOMIZE THE RESULTS OF THIS REPORT CARD TO YOUR ENVIRONMENT USING THE INTERACTIVE REPORT CARD®, A JAVA APPLET ON NETWORK COMPUTING ONLINE, AT *WWW.NETWORKCOMPUTING.COM.*

EXECUTIVE SUMMARY
STREAMING VIDEO

IP video has come a long way. The quality has improved dramatically, and the expense is relatively low—even free, if you use software-based streaming-video servers. And digital video is not just for downloading clips from the Internet anymore. Within the past year, companies have begun exploring the use of video for a variety of internal purposes to drive down other expenses, such as travel, while giving employees access to videoconferences, training sessions and other high-quality visual applications.

But you can still expect a trade-off between the relatively inexpensive software servers from Apple Computer, Microsoft Corp. and RealNetworks and the pricier hardware-encoding solutions from Amnis Systems and VBrick Systems. Both hardware and software solutions provide good-quality video. The software solutions let video traffic run at lower bit rates than hardware encoders require, but there's a visual cost: Image quality degrades when it's transmitted at lower speeds.

Our review of streaming video options covers the three major software servers, Apple's Darwin Streaming Server 4, Microsoft's Windows Media Services and RealNetworks' RealSystem iQ. We also examine Amnis' NAC-3000 and VBrick's 3200 and 6200 hardware-based streaming-video solutions. Apple edged out its competition, while Amnis just barely beat VBrick on the hardware side.

movie over and over, our numbers showed that Apple's Darwin Streaming Server 4 and QuickTime Player 5 package deserves top honors. Apple proved it could deliver a robust server and client that performed well. Its images beat the competition over a range of bandwidths. Best of all, the software is free, regardless of which operating system you're running.

RealNetworks' RealSystem solution took a close second and fell well behind Apple in the price category, since the costs of RealNetworks server software escalate into the thousands of dollars, based on the number of viewers you wish to serve. Finally, Microsoft's Windows Media Services fared poorly in all but the highest-bandwidth quality tests. If you're running Windows 2000 Server and all your clients are Windows-based, this software is a no-brainer, but it's truly the least common denominator in streaming video.

WHEN QUALITY IS THE NAME

Although all three software-based streaming servers we tested can transmit good-quality video at higher bandwidths, they require at least one computer to encode and a second to deliver video. You may want a solution that is easier to administer. Having one piece of hardware that can encode and deliver high-quality

video to the desktop is a great benefit. This quality and simplicity come with a price, though. Each player that is deployed to the desktop will cost anywhere from $30 to $150 per unit. If you have an enterprise of several thousand employees, the per-seat costs could drive the expense to the moon. You should also consider the additional bandwidth necessary to deliver this video to the desktop, as these devices typically encode either MPEG-1 or MPEG-2 streams and require an average of 1.5 Mbps of your network.
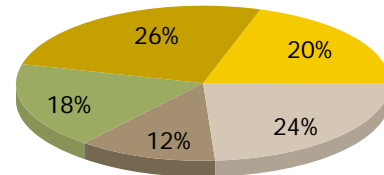
STREAMING SERVERS

B+ APPLE DARWIN STREAMING SERVER 4, QUICKTIME PLAYER 5

When most people hear the word *Apple*, they immediately think of solutions that require adding Macintosh computers to their networks. With Apple's Darwin Streaming Server, this couldn't be further from the truth. Apple's streaming server is available for several operating systems as a precompiled binary or as source code. In our blind testing, our judges picked the images from our Darwin Streaming Server as either the best or the second best in our five bandwidth tests. And with the server

Network Computing
EDITOR'S CHOICE

Does your organization plan to deploy real-time desktop video?

- We have deployed real-time desktop video
- Yes, within six to 11 months
- Yes, within 12 to 24 months
- Yes, beyond 24 months
- No

software being given away, finding fault with it is hard.

We tested Darwin Streaming Server public beta 4 on an Intel-powered whitebox running FreeBSD, as well as a Macintosh G4 PowerMac running Apple's OS X. Since a FreeBSD version of the beta was not available, we downloaded the source code and gave it a quick compile.

Once the server was started, it was ready to go. A browser-based interface is available to create playlists (a group of movies to be shown in succession) as well as manage the server and set up downstream proxy servers. All we needed was the stats page, as everything else gets set up automatically. To play prerecorded video, copy the file to the server and place it in whichever directory you have specified to contain streamed files. The server has no problems delivering the same clip to several players at the same time or in staggered playback tests.

Apple's directions for streaming a live video source are very simple. When we first read the instructions, we thought something was missing. But, indeed, the process was quite basic. That said, this is the one area that could use a smidgen of improvement. RealNetworks' RealSystem iQ server is actually easier to use for this purpose.

We chose a Winnov Videum 1000 capture card ($249) to capture the live video on a Windows 2000 computer and Sorenson Media's Broadcaster ($249) compression software with
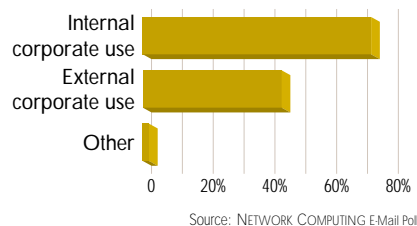
APPLE DARWIN VIDEO STREAM

Bytes per second
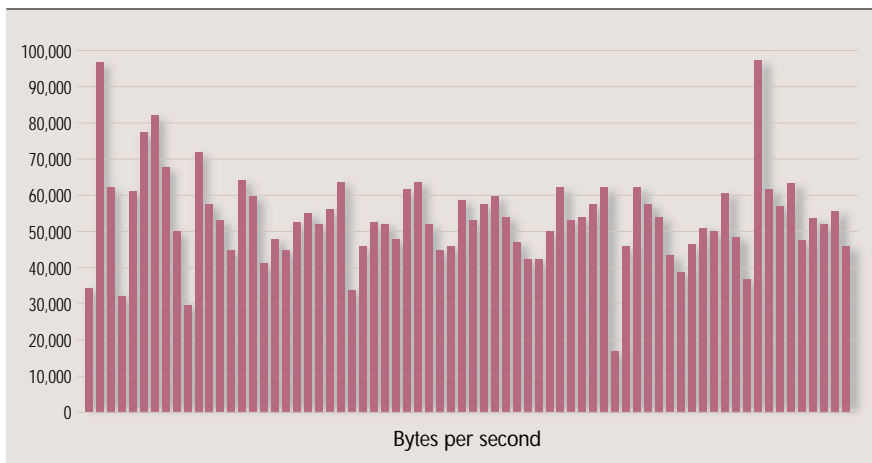
Sorenson 3 Professional encoder ($499) to encode the video at the desired bandwidth and send it to the streaming server. Sorenson also has a version of the software for Macintosh OS–based systems. If your video source is a digital camera, the Macintosh solution is better, as a direct FireWire (IEEE 1394) connection can be made between the computer and camera. You won't need a video capture card, and your video will remain a true digital stream.

Broadcaster lets the user specify the bandwidth along with frame rate and size, but we created our own. Predefined choices are available, but they seem to favor the H.261 encoder (an older standard than MPEG) built into Broadcaster instead of the Sorenson 3. In our blind tests, the H.261 encoder had very low scores; our testers preferred the Sorenson 3 encoded video.

Once we configured Broadcaster, we encountered two minor problems. First, the streaming server must be told of the stream to be sent to it, via an SDP (Session Description Protocol) file that is created and sent to the server by FTP. Creating the file requires clicking on the "announce" button within Broadcaster and telling it where to save the file on the encoding computer, then copying the file to the streaming server. Performing multiple tests with different bandwidth and quality settings, as we did, becomes tedious.

Even more annoying, each SDP file had to be edited to delete a line that specified timing for the stream before the server would send the

If you have deployed real-time desktop video, what is it used for in your organization?

Source: NETWORK COMPUTING E-Mail Poll

How will the video stream be used?
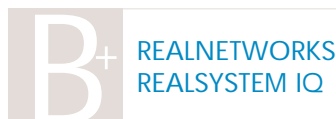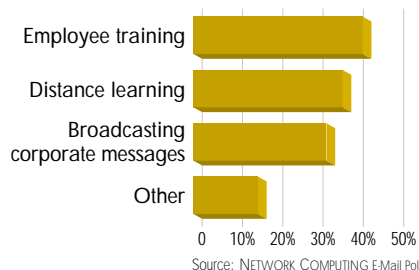

Source: NETWORK COMPUTING E-Mail Poll

video to the players. Either Sorenson needs to delete this line from the SDP file or Apple needs to ignore it. This problem should be resolved by the time you read this, as Apple has introduced its own compression/broadcasting software that will work with its server directly.

With the SDP file copied to the streaming server, the players need only be told of the path and file name before the video begins. The Sorenson 3 compressor is a VBR (variable bit rate) codec, unlike RealNetworks' and Microsoft's solutions, and is therefore more bandwidth-efficient in transmission: Only the necessary data is transmitted. This is obvious when looking at network usage in "Apple Darwin Video Stream" (see page 46). The Apple player's buffering is the quickest of all three: just 10 to 12 seconds, compared with 15 to 20 seconds for RealNetworks' and Microsoft's players.

Darwin Streaming Server 4, free download available at *www.publicsource.apple. com/projects/streaming/*; QuickTime Streaming Server 4, free download available at *www.apple.com/quicktime/ products/qtss*; QuickTime Player 5, free download available at *www.apple.com/ quicktime.* Apple, (800) MY-APPLE, (408) 996-1010. *www.apple.com*

B+ REALNETWORKS
REALSYSTEM IQ

Offering the most expensive of the solutions we tested, RealNetworks did provide us with the easiest-to-configure and -use servers. RealSystem iQ server might have edged out Apple's Darwin Server were it not for

the price, which ratchets up with the more streams you need to serve. For large needs, this can quickly add up into the tens of thousands of dollars. Even a small enterprise of 500 users would pay $3,995 for the server software only; a 2,000-user company would wind up shelling out $5,995.

Tweaking the RealSystem server beyond the simple setup is also not for the faint of heart or the inexperienced. While RealNetworks provides reams of documentation on its Web site on how to twiddle every nut and bolt, what's missing is the simple, step-by-step "Here's how to get it working" stuff. We later found out we were making the process more difficult than it really was: For our purposes, the "as installed" version works just fine.

We encountered no problems while using the RealSystem iQ server, though we found it temperamental to install on our FreeBSD server. That install would *coredump* when the installer tried to start the server processes. When started manually, the server acted as if it were working, but we couldn't access it via the Web browser to configure and monitor it. Ditching the instructions, we were able to get everything started by using the *default.cfg* configuration file instead of the one created by the install and recommended by the directions, then starting the server manually.

We loaded RealSystem Producer Plus 8.5 on a Windows 2000 comput-

HOW WE TESTED VIDEO SOLUTIONS

Video quality has always been a subjective matter. What one person likes, another may not. To counter this, we came up with a completely blind test for our quality. We created screen shots of the same scene from each player at different encoding rates: 56, 128, 256, 384 and 512 Kbps. We then cropped the shots to exclude the player and presented them to our volunteer judges. With each encoder, we tried several different combinations of quality for each bit rate and presented all the options to 24 judges, based in homes and offices all over the country. To achieve our final numbers for a given bandwidth/player combination, we calculated the top scores from each vendor, to give each one the best possible result.

We chose a cult movie classic, *The Adventures of Buckaroo Banzai Across the Eighth Dimension*, on DVD, as our source. This movie has enough action and static areas to put the encoders through their paces. Our encoding computers had Intel dual-processor motherboards with 800-MHz Pentium IIIs, running Windows 2000 Professional. Microsoft and RealNetworks recommended we use the ViewCast Corp. Osprey 500 video capture card, while Sorenson recommended the Winnov Videum card for its tests. Both cards performed well. The Osprey is much more expensive than the Videum but provides support for digital video and audio input in addition to the normal analog inputs. We had intended to use the Osprey card for all our tests but found that Sorenson's Broadcaster had problems with some, so we used the Videum for those tests.

For the Osprey card, we provided a FireWire (IEEE 1394) digital video signal from our DVD player through a signal converter. This allowed our video to maintain its digital form the entire way through the process. For the Videum card, we connected our DVD player via an S-Video connection and unbalanced stereo audio.

Our servers were set up on the same Pentium III–based dual-processor hardware, with the only difference being the operating system. Apple's and RealNetworks' servers were loaded on a computer running FreeBSD, while Microsoft's server was tested on a Windows 2000 Server box, as that is the only platform Media Services runs on. For clients, we loaded all three players on computers running Windows 98, Windows 2000, Macintosh OS 9.2 and OS X. Bandwidth usage was monitored by EtherPeek software from WildPackets.

For our tests on the products from Amnis and VBrick, we used the same DVD source connected directly to each vendor's box. We then routed the IP video through an Empirix PacketSphere to simulate network degradation. The video then arrived at a computer running Windows 2000, where it was displayed in the player. Because we were unable to take screen shots of the MPEG video, for quality tests we set up two identical monitors side by side and compared the video coming from both systems simultaneously.

In creating our report card, we could not do a strict apples-to-apples comparison. Video quality is most heavily weighted in both cases, but other factors deserve different amounts of attention. Thus, we considered quality 30 percent of the score in the hardware testing but 40 percent in the software testing.

er to perform our encoding. We also installed a ViewCast Corp. Osprey 500-DV Pro video capture card ($1,995) to pull in video. You don't need to spend nearly $2,000 for a video capture card, but RealNetworks and Microsoft recommended the card for our testing purposes. The View-Cast card has a built-in FireWire interface so we could easily bring the video and audio in through this connection. The hardest part of working with this card was getting it into the computer. With the BNC and other connectors hanging off the back, it's tough to angle the card into a PCI slot without needing to bend the back of the computer out of the way.

Producer is extremely easy to use. It recognized the ViewCast card automatically and walked us through

WHAT PRICE STREAMING VIDEO?

D oes streaming video increase revenue? Does it decrease total cost of ownership? Most top managers are asking these questions today. Streaming video technologies can do either—sometimes nearly expense-free.

Determining whether streaming video is cost-effective to an organization's needs depends largely on the WAN bandwidth required, since much of the software is free. If an organization doesn't require multiple instances, or that the application will run over a LAN, streaming video has a number of possibilities. Otherwise, the added bandwidth will contribute a substantial cost—as much as 65 percent, as seen in the sample breakdown below.

Take, for instance, the following two fictitious companies—one is looking to drive sales revenue and the other is looking to reduce costs. Neither company has a budget for adding streaming video, so creativity is key.

Millennium 21 is a 500-person, $20 million real-estate organization in Chicago. It shows properties on its Web site to registered clients, who pay a fee to download video clips. The files are large and downloads are slow, but the company's main concern is accuracy. Properties sell quickly, and there is no way to update the information once it has been downloaded. Millennium 21 estimates that a more effective application would increase sales by 15 percent within six months.

Streaming video addresses the problem, but the chosen solution has to have a universally available player, work in a Unix environment, be supported by hosting provider Digex, perform well over the Internet, leverage existing bandwidth and support up to 75 simultaneous users.

RealNetworks' RealSystem iQ and Apple's QuickTime 5.0 are under consideration. Microsoft's Windows Media Services

is eliminated because it operates in a Windows environment only. RealNetworks and Apple offer free players that can be downloaded. Apple's server software is free; RealNetworks' would cost $4,000. Millennium 21 decides to go with Apple's product.

Why? Given the potential to increase revenue by $2 million to $3 million, and all other costs being equal, Millennium 21 decided to save the extra $4,000 it would cost to use RealSystem.

Suburban Style is a 10,000-person, $75 million clothing catalog company with call centers in Ireland. It also provides its call-in customers with fashion advice. To ensure that its consultants are familiar with the latest products, the company has been producing CDs with video clips on how to sell the products. Each shift of operators receives 25 CDs every two weeks, at a total cost of $25,000 per year. The company believes streaming video would be a better solution, as long as it leverages Suburban Style's environment of 18 Windows 2000 servers, consumes less than 15 percent of LAN bandwidth, enables on-demand viewing for 10 to 15 operators simultaneously and requires no added investment.

Suburban Style evaluates RealNetworks' and Microsoft's solutions, choosing not to introduce Apple into its environment. Both solutions can accommodate 10 to 15 simultaneous users, but the up-front investment of $2,000 per server for the RealNetworks solution ($36,000 in all) makes it more costly than the CDs. Suburban Style chooses Microsoft for the cost savings.

Shally Bansal Stanley manages Greenwich Technology Partners' Network Economics practice, where she analyzes financial and contractual impacts to changes in voice, data and wireless infrastructures. Send your comments on this article to her at sstanley@greenwichtech.com.

STREAMING-VIDEO COSTS

65%
Bandwidth

15%
Servers

15%
Support

5%
Server software

0%
Player
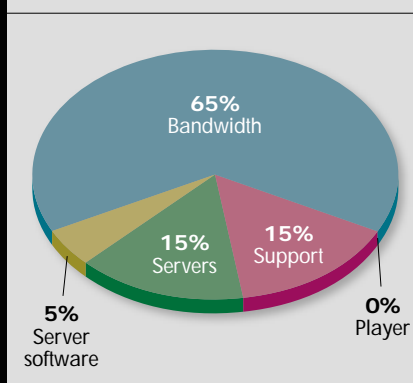
setting up our encoding by selecting the type of audio and video to be generated. Producer will encode pre-existing or live video for playback by the server. Unlike the Sorenson Broadcaster, RealSystem Producer asks the IP address of the RealSystem iQ Server and sets up the connection and files without user intervention. No need to edit and copy any files to the server—what a relief.

Our judges deemed Producer's low-bit-rate video the best. This shows RealNetworks' strength of creating and streaming video for the

In which formats do you provide content for external customer use?

Source: NETWORK COMPUTING E-Mail Poll
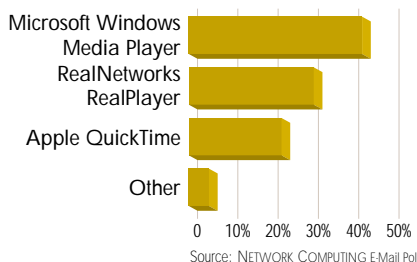
Internet to 56-Kbps modem users. RealNetworks came in second, behind Apple-Sorenson, for the midrange bit rates and third at our highest test bit rate.
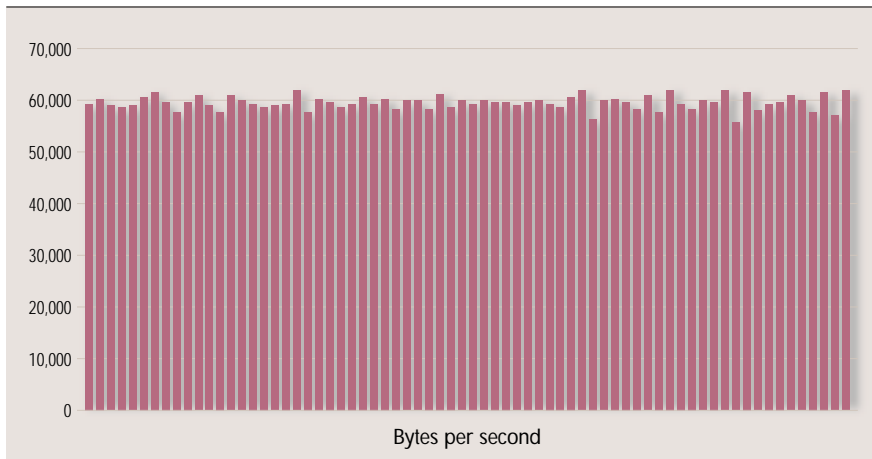
We had problems with banding—solid colors appearing where color gradation is supposed to be—in our screen captures when we viewed

them using the RealOne Player. Although we tried several times to eliminate it, we were unsuccessful and instead told our judges to ignore it. The video stream is also at a fairly constant bit rate (see "RealNetworks RealServer iQ Video Stream," below). This makes it easier for enterprises transmitting over bandwidth-restricted networks but may not offer the efficiency of a VBR encoder like Sorenson.

For the enterprise customer with a heterogeneous network, Real-Networks has a version of its RealOne Player for just about every Windows and Unix platform, though there's still no support for Macintosh OS X. RealNetworks is working on a version for the new Apple operating system but won't have it ready until later this year. The downside to the RealNetworks players is the time needed to buffer data before playing begins. RealOne Player takes between 15 and 20 seconds to buffer and begin playing.

RealNetworks is also the only player that has scrolling ad space for channels to news and other entertainment organizations. We could minimize the window to get rid of this, but then we couldn't get to the volume and window-size controls. We also found it annoying that immediately after downloading the player from Real-Networks' Web site, we were notified that the player was out of date.

RealSystem iQ: RealSystem Server Basic, free for 25 concurrent viewers; RealSystem Server Plus, $1,995 for 60 concurrent viewers; RealSystem Server Intranet, starting at $3,995 for 200 to 500 concurrent viewers; RealSystem Server Professional, starts at $5,995 for 100 to 2,000 concurrent viewers; RealSystem Producer Plus 8.5, $199.95; RealOne Player, free. RealNetworks, (800) 444-8011, (206) 674-2700. *www.realnetworks.com*

C- MICROSOFT WINDOWS MEDIA SERVICES
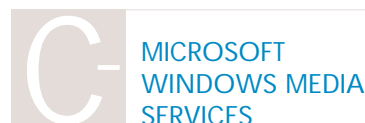
Microsoft Media Services' images scored dead last in four of our five quality tests. Unless you're an all-Microsoft shop, you can do better. Then again, it is free if you're already using Windows 2000 Server. And if you're using anything else, you can't have it anyway, since Windows Media Services isn't available as a standalone product.

For streaming a live video source, Media Services is the most difficult to configure, even though Microsoft provides step-by-step instructions for setting up such a stream. Live sources require users to create either a unicast (one sender, one receiver) or a multicast (one sender, many simultaneous receivers) station. A setup wizard is available to step you through the process, which creates the connection between the server and the encoder. While an experienced person could whip through this easily, we wish we could do it from one place instead of having to set up the encoder and server separately.

REALNETWORKS REALSYSTEM IQ VIDEO STREAM

Bytes per second

Which is the most important aspect of a video stream?

- Quality
- Low bandwidth
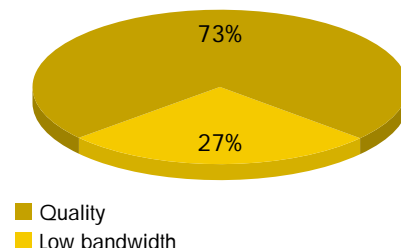
Source: NETWORK COMPUTING E-Mail Poll

Windows Media Encoder provides another setup wizard to configure the encoding. We used the same ViewCast video capture card as for the tests with RealNetworks' solution. Media Encoder allows simple setup of the compression for the audio and video. Preconfigured settings are available for those that want a quick process to stream video. By comparison, streaming a pre-existing video clip is no problem; just copy the clip to the server, and it's ready to be played.

While the Windows Media stream has a constant bit rate for the most part, we found that occasionally the data stream undulated at lower bit rates. The data rate would start out with slight shifts that would build on themselves until no packets got out in one second and had to be combined with the next second's packets. The rate would then slowly begin settling back out but would begin again a few minutes later. We tried several times to replicate this to see if it was in some way tied to the video source, but we found no correlation. While this didn't affect the video quality in our tests, it could be disastrous on networks that employ traffic shaping or other QoS (Quality of Service) measures.

We also had a problem of "jail bars" appearing from time to time at some of the bandwidths we tested. These are black and white vertical bars about 5 pixels in width that appeared over the upper half of the video for just one or two frames, then vanished. The jail bars occurred at random times. We could neither reproduce them at will nor could we explain why they occurred. Microsoft never returned a call when we sought an explanation.

On the player side, Microsoft supports all its own OSes as well as those from Apple. Support of Unix players is nonexistent except for an older version for Sun Microsystems Solaris.

Buffering time in Windows Media Player is about the same as that in RealSystem iQ: 15 to 20 seconds. Microsoft aims to drastically reduce buffering times in its next release, code-named Corona. Instead of transmitting at normal rates during the buffer process, the server will instead burst the information to the client initially. This won't work if there isn't enough unused bandwidth to burst the buffer.

Windows Media Services, included with the Windows 2000 Server; Windows 2000 Server, $1,199 with 10 client access licenses; Windows Media Player, free. Microsoft Corp., (800) 426-9400, (425) 882-8080; fax (425) 936-7329. *microsoft.com/windowsmedia/*

HARDWARE ENCODERS

A− AMNIS SYSTEMS NAC-3000 LIVE STREAMING VIDEO SERVER/ENCODER AND LIVEPLAYER 1.2 STREAMING MEDIA DESKTOP PLAYER

If our tests were the Kentucky Derby, Amnis' solution would win by a nose. Choosing the NAC-3000 Live Streaming Video Server/Encoder and LivePlayer 1.2 Streaming Media Desktop Player as our Editor's Choice award winner was difficult, as both vendors here have great products. What pushed us over the edge is the one-box solution Amnis offers for encoding both MPEG-1 and MPEG-2 streams and options available for streaming.

Network Computing EDITOR'S CHOICE

Do you provide streaming players as part of your supported desktop environment?

70%

30%

■ Yes
■ No
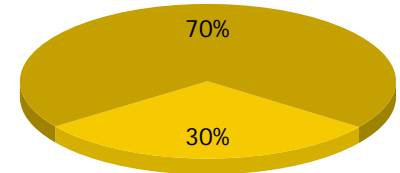
We first tested the Amnis NAC-3000 last spring, when we evaluated products that deliver broadcast-quality video over networks (see "Is It Live or Is It Digital Video?," at *www.nwc.com/1214/1214f1.html*). This time, instead of testing the decoder, we tested the desktop player, LivePlayer, with the encoder. LivePlayer can be installed under Windows 95 or higher, but if you want MPEG software decoding, the client must be running at least Microsoft Windows 98. We ran our tests under Windows 2000.

LivePlayer installed without any fuss once we figured out that LivePlayer and VBrick's StreamPlayerII couldn't be installed on the same computer. We couldn't identify the source of the conflict, but we believe there was a DLL conflict. Both players use and modify some portions of the Microsoft Windows Media Player.

Setting up the NAC-3000 was straightforward, but, as was the case in our last review, we still don't care for the telnet-based interface. Amnis is working on a fully graphical interface for configuring the units and

REPORT CARD ● Hardware Encoding Solutions		Amnis Systems NAC-3000 Live Streaming Video Server/Encoder	VBrick Systems VBrick 3200 and VBrick 6200
	Weight		
VIDEO QUALITY	30%	5	4
BIT-RATE VARIATION	20%	5	3
PLAYER FUNCTIONALITY	20%	4	5
COST	15%	4	5
EASE OF SETUP/USE	15%	3	4
TOTAL SCORE		**4.35**	**4.15**
		A−	**B+**

A≥4.3, B≥3.5, C≥2.5, D≥1.5, F<1.5 A-C GRADES INCLUDE + OR − IN THEIR RANGES. TOTAL SCORES AND WEIGHTED SCORES ARE BASED ON A SCALE OF 0-5. CUSTOMIZE THE RESULTS OF THIS REPORT CARD TO YOUR ENVIRONMENT USING THE INTERACTIVE REPORT CARD®, A JAVA APPLET ON NETWORK COMPUTING ONLINE, AT *WWW.NETWORKCOMPUTING.COM*.

should have it ready for consumers around summertime.

On the client side, LivePlayer will autodetect video streams created by any of Amnis' products and list those streams in the window. After selecting the stream we wanted to view and waiting a few seconds for initial buffering, we were watching our video in MPEG-1 SIF (Standard Interchange Format—typically 352 by 240) on the screen. We liked that the NAC-3000 has more resolution options than either of the VBrick solutions tested. The NAC-3000 also holds true to the encoding bit rate and can be varied through a wider range than the VBrick units.

L ike the players used for our streaming server tests, LivePlayer has the normal buttons for play, pause and stop, but it has one extra for record. This is something that the streaming server manufacturers haven't included in their products yet, and none will say if they will. By clicking the record button, you can actually save the video you are watching to your hard drive, and with MPEG quality, it's good, clean video. This feature is useful for archiving live video. A player near the source can be set to record the live video while it is being broadcast to everyone else within an organization. This archived video can then be stored on a server for later viewing by anyone using the player.

LivePlayer has two serious drawbacks. First, the player does not automatically resize to the resolution being played. While the player window can be resized, doing so manually often creates nonsquare pixels or an image that is larger or smaller than what was encoded.

Second, the player has a terrible problem with *tearing*. This phenomenon is well known by video folks who regularly move video between interlaced and noninterlaced systems. Tearing appears as horizontal lines that don't align themselves with those above or below. While the VBrick StreamPlayerII did show a bit of tearing, it was nowhere near what we observed in LivePlayer. Under normal circumstances, the tearing isn't very noticeable, but under the strain of our tests, it was quite apparent.

LivePlayer 1.2 Streaming Media Desktop Player, from $30 to $150 depending on version; NAC-3000 Live Streaming Video Server/Encoder, $6,995 to $13,995 depending on configuration; NAC-4000 Live Streaming Video Decoder/Receiver, $2,995. Amnis Systems (formerly Optivision), (800) 239-0600, (650) 855-0200; fax (650) 855-0222. *www.amnisinc.com* or *rayas@amnisinc.com*
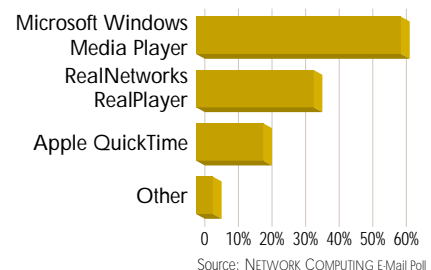
VBRICK SYSTEMS VBRICK 3200, VBRICK 6200 AND VBRICK STREAMPLAYERII

With only two vendors to test, we might assume that one product would be the loser. This is not true in VBrick's case. We liked several things about the units tested, but Amnis' solution squeaked past VBrick's.

VBrick supplied us with its 3200 MPEG-1 encoder and 6200 MPEG-2 encoder. The two products remind us of stepchildren: They appear to have come from two groups within the company, and neither knew of the other's existence.

The VBrick 3200 is configured from the VBAdmin Administrator application, which runs on a Windows operating system. VBrick provides many more configuration options than Amnis does. The options are categorized under tabs that stretch into the next cubicle—20 tabs in the scroll pane near the bottom of the window. Even with all the options, VBAdmin is simple to use.

STREAMING VIDEO SOLUTION FEATURES

SOFTWARE	Apple Computer Darwin Streaming Server 4	Microsoft Windows Media Services	RealNetworks RealSystem iQ
Server OS	Apple Macintosh, Microsoft Windows, Linux, Sun Solaris; source code available	Microsoft Windows	Microsoft Windows, Linux, Sun Solaris, Compaq Tru64, FreeBSD, Hewlett-Packard HP-UX, IBM AIX
Client OS	Apple Macintosh, Microsoft Windows	Apple Macintosh, Microsoft Windows (previous version available for Sun Solaris)	Apple Macintosh, Microsoft Windows, third-party Unix support
MPEG-4 support	Y	N	Y
Configurable via browser	Y	Y	Y
Price	Free	Free with Microsoft Windows 2000 Server (not available as standalone application)	Ranges from free for 25 concurrent users to $5,995 and higher for 100 to 2,000 users

HARDWARE	Amnis Systems NAC-3000 Live Streaming Video Server/Encoder	VBrick Systems VBrick 3200	VBrick Systems VBrick 6200
Combined MPEG-1/MPEG-2 support	Y	N	N
Composite video input	Y	Y	Y
S-Video input	N	Y	Y
Web interface for configuration	N	N	Y
Video output	N	Y	Y
Balanced/unbalanced audio support	Y (through balanced ports)	N	Y (separate connections)
Player compatibility	Microsoft Windows	Apple Macintosh, Microsoft Windows	Microsoft Windows
Price	$6,995 to $13,995	$4,995	$9,995

Y = YES   N = NO

Which streaming player do you provide for your users?

Microsoft Windows Media Player
RealNetworks RealPlayer
Apple QuickTime
Other

0 10% 20% 30% 40% 50% 60%

Source: NETWORK COMPUTING E-Mail Poll

Do you let employees load players not provided by your organization on their desktop computers?

65%

35%
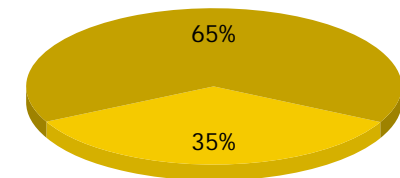
■ Yes
■ No

Source: NETWORK COMPUTING E-Mail Poll

We were annoyed to find out that resolution changes required the 3200 to reset itself. This process takes about two minutes, and nothing can be changed in the configuration until the box has restarted.

The 6200 looks completely different from the 3200 on the outside, most notably because of its LCD status display. These lights display the unit's IP address and broadcast address. The differences continue in the configuration, as the 6200 is accessed with a Web browser that has options grouped under five tabs for easier editing. Resolutions can be changed on the fly, without the unit needing a restart. That's a big improvement over the 3200. We only wish the 6200 could include the 3200's MPEG-1 capabilities in the same box.

To play back video from both, we used VBrick's StreamPlayerII software installed on a Windows 2000 computer. VBrick has a Macintosh version that will play MPEG-1 streams under OS 9. Because of a problem within Apple's MPEG decoder, the audio and video drift apart after a few minutes. Apple expects to resolve the problem with its next release of QuickTime, version 6, which touts new MPEG-1 and MPEG-2 decoders. StreamPlayerII also will record the streams to the local hard drive if desired, from a Windows or Macintosh computer.

We liked the VBrick 3200's MPEG-1 video quality better than that of the Amnis NAC-3000. Although the image appeared sharper and crisper, however, there was obvious color banding that was not present in the NAC-3000. During our MPEG-2 tests, the results reversed. The VBrick 6200's video looked mushy and not as clear as the Amnis unit's output. Our major complaint is that the encoding bit rate cannot be changed below preset amounts. This can be seen in our test results. The VBrick 6200 consistently used more bandwidth for the same resolution than did the NAC-3000. There is a manual setting, but the 6200 wouldn't let us set this below what it was using.

VBrick also makes a software product for customers who want to stream to Windows Media Players. VBrick VBXcoder will receive an MPEG stream from either the 3200 or the 6200 and convert it into Windows Media Format (*.wmv*) for streaming to the desktop. This solution can be used to stream both internally, directly from the MPEG source, and externally, at lower bit rates from the VBXcoder. Using the free Windows Media Player can reduce some of the costs associated with the hardware-based encoding solution.

VBrick 3200, $4,995; VBrick 6200, $9,995; VBrick VBXcoder, $2,999; VBrick StreamPlayerII, $30 per PC or on a site-license basis. VBrick Systems, (866) 827-4251, (203) 265-0044. *www.vbrick.com* or *info@vbrick.com* ᴺᶜ

Darrin Woods is a technology editor of NETWORK COMPUTING and previously worked as a WAN engineer for a telecom carrier. Send your comments on this article to him at dwoods@nwc.com.

WEB LINKS

» **"Shrinking the Video: How Codecs Work"** (NETWORK COMPUTING, Feb. 18, 2002) *www.nwc.com/ 1304/1304ws1.html*

» **"Picture Perfect Video"** (NETWORK COMPUTING, July 9, 2001) *www.nwc.com/1214/1214f2.html*